

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in this application:

Listing of Claims:

1-5. (Canceled)

6-9. (Previously Canceled)

10-22. (Canceled)

23-24. (Previously Canceled)

25-28. (Canceled)

29. (Previously Canceled)

30-34. (Canceled)

35-43. (Previously Canceled)

44-48. (Canceled)

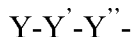
49-61. (Previously Canceled)

63-65. (Canceled)

66. (New) A ligand analog that binds covalently to a nucleophilic receptor (NuR) having the formula



wherein L is a ligand that binds noncovalently to a NuR and E is an electrophilic group conjugated to a side chain functional group of L having the formula



wherein

Y is an electrophilic group that reacts covalently with NuR,

Y' is a charged or neutral group, or is absent, and

Y'' is a linker, covalent bond or atom.

67. (New) The ligand analog of claim 66, wherein L is comprised of amino acid, sugar, lipid or nucleotide groups.

68. (New) The ligand analog of claim 67, wherein said L is comprised of amino acid groups.

69. (New) The ligand analog of claim 66, wherein Y'' is a linker.
70. (New) The ligand analog of claim 66, wherein Y' is a charged or neutral group.
71. (New) The ligand analog of claim 66, wherein the side chain functional group of L is -NH₂, -COOH, -SH or -OH.
72. (New) The ligand analog of claim 66, wherein the side chain functional group of L is selected from the group consisting of carboxyl, amino, hydroxyl, sulfhydryl, 4-hydroxy phenyl, phenyl imidazole, indole, methylthioethyl, guanidino, linear alkyl, branched alkyl, cyclic alkyl, linear alkenyl, branched alkenyl, cyclic alkenyl, linear alkynyl, branched alkynyl, cyclic alkynyl, aryl, amide, aldehyde, ketone, phosphate or sulfate.
73. (New) The ligand analog of claim 66, wherein the side chain functional group of L is a side chain functional group of alanine, leucine, isoleucine, valine, methionine, cysteine, aspartic acid, glutamic acid, asparagine, glutamine, lysine, arginine, phenylalanine, tyrosine, tryptophan, histidine, serine, threonine or proline.
74. (New) The ligand analog of claim 66, wherein the ligand is a DNA molecule, a RNA molecule, a polysaccharide or a lipid that binds noncovalently to NuR.
75. (New) The ligand analog of claim 66, wherein Y'' is a suberoyl, pimeroyl, aminohexanoyl, aminoacetyl, poly(ethylene oxide), α,ω -dicarboxyl or acetylenedicarboxyl group.
76. (New) The ligand analog of claim 66, wherein Y' is a charged group selected from amino (4-amidinophenyl)methyl, 2,6-diaminopentyl, 1-amino-4-guanidinobutyl, 1-amino-3-carboxylpropyl and amino(4-carboxylphenyl)methyl.

77. (New) The ligand analog of claim 66, wherein Y' is a neutral group selected from amino (phenyl) methyl, 1-amino-2-phenylethyl, 1-amino-2-methylbutyl, aminomethyl, 2-aminoethyl and 1-aminocyclohexyl.

78. (New) The ligand analog of claim 66, wherein Y comprises an electrophilic atom Z attached to one or more substituents R.

79. (New) The ligand analog of claim 78, wherein substituent R is an electron withdrawing group.

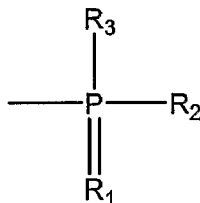
80. (New) The ligand analog of claim 79, wherein R is selected from phenoxy, 4-nitrophenoxy, 4-cyanophenoxy, pentachlorophenoxy, 4-nitrophenyl, 4-cyanophenyl, cyanomethoxy, trifluoromethoxy and 4-nitrophenylmercaptyl.

81. (New) The ligand analog of claim 78, wherein R is an electron donating group.

82. (New) The ligand analog of claim 81, wherein R is selected from 4-methoxyphenoxy, 4-methylphenoxy, methoxymethoxy, 4-methoxyphenyl, 4-methylphenyl, methoxymethyl and 4-methoxyphenylmercaptyl.

83. (New) The ligand analog of claim 78, wherein Z is a phosphorus, carbon, boron or vanadium atom.

84. (New) The ligand analog of claim 83, wherein Y has the formula:



wherein R₁ is an oxygen or sulfur atom, and R₂ and R₃ are independently hydrogen, oxygen, fluorine, chlorine, bromine, iodine, sulfur, hydroxyl, sulfhydryl, amino, alkoxy or phenoxy.

85. (New) The ligand analog of claim 78, wherein R is glyoxylpeptide or aminoacylpeptide.

86. (New) The ligand analog of claim 66, wherein L is vasoactive intestinal peptide (VIP), Factor VIII, β -amyloid peptide, CD4, extracellular domain of epidermal growth factor receptor (EGFR), human immunodeficiency virus (HIV) gp120, HIV gp160, Lex1 repressor, gag, pol, hepatitis B surface antigen, diphtheria toxin, C. tetani toxin, C. botulinum toxin, or pertussis toxin.

87. (New) The ligand analog of claim 66, wherein NuR is an antibody.

88. (New) The ligand analog of claim 87, wherein the antibody is a member of the group consisting of alloantibodies to Factor VIII, red blood cell antigens, platelet antigens, kidney antigens, heart antigens and lung antigens.

89. (New) The ligand analog of claim 66, wherein NuR is gp120.

90. (New) The ligand analog of claim 89, wherein L-E is electrophilic gp120.

91. (New) The ligand analog of claim 66, wherein:

L comprises a polypeptide;

the side chain functional group of L is a side chain functional group of alanine, leucine, isoleucine, valine, methionine, cysteine, aspartic acid, glutamic acid, asparagine, glutamine, lysine, arginine, phenylalanine, tyrosine, tryptophan, histidine, serine, threonine or proline;

the side chain functional group of L is selected from the group consisting of carboxyl, amino, hydroxyl, sulfhydryl, 4-hydroxy phenyl, phenyl imidazole, indole, methylthioethyl, guanidino, linear alkyl, branched alkyl, cyclic alkyl, linear alkenyl, branched alkenyl, cyclic alkenyl, linear alkynyl, branched alkynyl, cyclic alkynyl, aryl, amide, aldehyde, ketone, phosphate or sulfate;

Y' is a suberoyl, pimeroyl, aminohexanoyl, aminoacetyl, poly(ethylene oxide), α,ω -dicarboxyl or acetylenedicarboxyl group; and

Y' is a amino(4-amidinophenyl)methyl, 2,6-diaminopentyl, 1-amino-4-guanidinobutyl, 1-amino-3-carboxylpropyl, amino(4-carboxylphenyl)methyl, amino (phenyl) methyl, 1-amino-2-phenylethyl, 1-amino-2-methylbutyl, aminomethyl, 2-aminoethyl or 1-aminocyclohexyl group.

92. (New) The ligand analog of claim 91, wherein L comprises vasoactive intestinal peptide (VIP), Factor VIII, β -amyloid peptide, CD4, extracellular domain of epidermal growth factor receptor (EGFR), human immunodeficiency virus (HIV) gp120, HIV gp160, Lex1 repressor, gag, pol, hepatitis B surface antigen, diphtheria toxin, C. tetani toxin, C. botulinum toxin, or pertussis toxin.

93. (New) An isolated covalent complex comprising:
a ligand analog according to claim 1 that binds noncovalently to a nucleophilic receptor;
and
the nucleophilic receptor,
wherein the ligand analog and the nucleophilic receptor are covalently bound to each other.

94. (New) A pharmaceutical composition, comprising:
a ligand analog according to claim 1; and
a pharmaceutically acceptable carrier.